3.5 Fish and Wildlife

3.5.1 Sources of Information

Primary sources of information related to habitat, fish, and wildlife include:

- Site-specific biological resource surveys conducted between September 1998 and October 1999 by the applicant's consultants (Dames and Moore and Black & Veatch)
- Scientific literature (as cited)
- Interviews with local biologists
- Species lists provided by the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service
- Aerial photos (dated August 17, 1998)
- Topographic maps (Bellingham North, Bertrand Creek, Blaine, Kendall, Lawrence, Lynden, and Sumas quadrangles 7.5 minute series)
- Alignment sheets for the S2GF/Custer and S2GF/Bellingham transmission line routes provided by the applicant's consultant (Black & Veatch)
- Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species maps
- The ASC for the Sumas Energy 2 Generation Facility (Sumas Energy 2 et al. 2000)

3.5.2 Existing Conditions

3.5.2.1 Overview

The project area is located within northern Whatcom County, which is a relatively flat, agricultural lowland containing cropland and pasture interspersed with dense patches of forest and streamside vegetation. Homes, farms, and light industry are scattered throughout the landscape, connected by a wide range of county roads and highways. Many of the smaller roads form a grid-like pattern typical of farming country. Residential uses are concentrated near the urban centers of Sumas, Lynden, and Bellingham.

Within the project area, fish are associated with the larger streams and rivers, most notably the Nooksack and Sumas Rivers and Sumas Creek. Several other creeks, as well as wetlands, seasonal drainages, and uplands, are also considered an element of fish

habitat because of the critical role these areas play in water quality and water supply, and in performing other ecological functions (such as contributing woody debris for habitat structure).

Salmon and trout are the most important fish in this area. Coho salmon, chum salmon, coastal cutthroat, steelhead trout, and native char (bull trout and Dolly Varden) are known or expected to inhabit many of the creeks and streams. Pink salmon and the threatened Puget Sound chinook salmon are also present within the Nooksack River. (Note: Scientific names for fish and wildlife species are listed in Appendix E; common names are used in the text for readability.)

The area supports relatively diverse wildlife populations. Common wildlife includes small mammals (moles, voles, shrews, and mice), raccoons, skunks, black-tailed deer, and opossum. Muskrats, beavers, mink, and river otters may be found along the banks of the streams and the Sumas and Nooksack Rivers.

Large flocks of waterfowl are common during spring and fall migration as well as during winter. Trumpeter swans and sandhill cranes also winter in the area. Several birds of prey are also common in the area, including red-tailed hawks, northern harrier, American kestrel, great horned owl, and bald eagle. Forested and shrubby habitats provide nesting and feeding sites for a wide range of song birds.

3.5.2.2 Key Species and Habitats of Concern

To incorporate local species of concern, as well as consistency with local environmental review, this assessment focuses on Whatcom County Code, 16.16.710 critical areas. This ordinance defines the following types of areas as key areas of environmental review for fish and wildlife (referred to collectively as fish and wildlife habitat conservation areas):

A. Areas with which listed species have a primary association (meaning species officially designated by the WDFW and/or USFWS as endangered, threatened, sensitive, or candidate)

B. Habitats and species of local importance

C. Shellfish habitat conservation areas

D. Kelp and eelgrass beds, Pacific herring spawning areas

E. Surf smelt and Pacific sand lance spawning areas

F. Ponds and wetlands

G. Lakes and marine water bodies

H. Rivers and streams

I. Natural area preserves (Ord. 97-056 § 1)

Of these, categories A (listed species), B (habitats and species of local importance), F (Ponds and Wetlands), and H (Rivers and Streams) are present in the project area.

Listed Species and Species of Local Importance

Table 3.5-1 lists species and habitats known or assumed to be present in the project area and potentially affected by project construction and/or operation. Table 3.5-2 lists species evaluated but determined to be absent (or potentially present, but for which no sensitive, primary and/or limiting habitat is present).

Ponds and Wetlands (as Fish and Wildlife Habitat)

Ponds and wetlands are described in Section 3.4. Most of the wetlands have been greatly altered due to agriculture and other human activities. Still, these wetlands may support some amphibians as well as marsh-associated birds (e.g. marsh wren, red-winged blackbird). Wetlands I, J, K, and L contain shrubby and/or forested habitat that provide habitat for more diverse wildlife communities, including larger mammals (e.g. mink).

Other wetland functions and values are described in Section 3.4.

Rivers and Streams

The project area includes numerous drainage ditches. The most notable rivers and streams in the project area are as follows:

- Johnson Creek, Bone Creek, and the Sumas River (within the proposed natural gas pipeline route)
- Sumas Creek (within the proposed sewer and water pipeline routes and the 230 kV S2GF to Canadian border electrical transmission line)
- South fork of Dakota Creek (two crossings), Fishtrap Creek, Bertrand Creek, and Pepin Creek/Double Ditch (within the proposed 230 kV S2GF to Canadian border electrical transmission line); and
- Squalicum Creek, Johnson Creek, the north fork of Johnson Creek and the Nooksack River (within the proposed S2GF/Bellingham electrical transmission line route)

Table 3.5-3 describes the location of rivers and streams crossed by project features. Appendix E lists in detail the fish species present and salmonid habitat of those streams.

Table 3.5-1. Special Status Species Likely to be Present within the Proposed Project Area

Species	Status	Key Habitats of Concern	Key Habitat Present within Affected Environment
Bald eagle (*Haliaetus leucocephalus*)	FT, SC	Nests/roosts Perch trees Concentrated foraging Open fields	Nest located 1/8 mile west of transmission[1] in the Johnson Creek area Nest located 1/3 mile northwest of crossing A-S15 on the south bank of the Nooksack River Nest located 1 mile north of natural gas pipeline and 1 mile east of the plant site along the Sumas River Occasional foraging throughout area Concentrated foraging along Nooksack River and in late winter
Bull trout (*Salvelinus confluentus*)	FT	Rivers/streams where present, associated riparian areas and contributing waters	Occasional Bull Trout in Bertrand and Fishtrap Creeks Potential rearing in Johnson and Sumas Creeks
Chinook salmon (*Oncorhynchus tshawytscha*)	FT, SC	Rivers/streams where present, associated riparian areas and contributing waters	Documented in Nooksack River basin and independent drainages Use the Nooksack River in the project vicinity as a migration corridor Fall-run spawn in the north fork of Dakota Creek Planted, but sustaining population not documented in Squalicum Creek
Coho salmon (*Oncorhynchus kisutch*)	FC	Rivers/streams where present, associated riparian areas and contributing waters	Rear young in Johnson and Sumas Creeks Spawn in Sumas Creek, upper Johnson Creek, the north fork of Johnson Creek, and tributaries north of the project Rear young in Bone Creek in the vicinity of the pipeline Sumas River is a migration corridor to spawning
Pacific Lamprey (*Entosphenus tridentatus*)	FSC	Rivers/streams where present, associated riparian areas and contributing waters	Species is known to spawn and rear in the Sumas River and Nooksack River basins Likely to spawn and rear young in all of streams in the vicinity of the project area The status of populations in project area streams and rivers is unknown at this time, no Pacific lamprey have been sampled in the project area

Species	Status	Key Habitats of Concern	Key Habitat Present within Affected Environment
River Lamprey (*Lampetra ayersi*)	FSC, SC	Rivers/streams where present, associated riparian areas and contributing waters	No river lamprey have been sampled in the project area Species is known to spawn and rear in the Sumas and Nooksack River basins River lamprey are likely to spawn and rear in the lower reaches of all of the larger streams in the vicinity of the project area The status of river lamprey populations in project area streams and rivers is unknown at this time
Vaux's swift	SC	Chimneys for roosting Forested areas for roosting and nesting	Roost in large numbers in the chimney of the old Sumas Customs Building near the proposed sewer line (WDFW 1998b and WDFW 1999) Suitable roosting and nesting sites, in the forested areas, are scarce within the project area
Red legged frog (*Rana aurora*)	WCSLI	Streams and forested wetlands with dense ground cover Deep, still or slow moving water	Segments of the project area are within the core habitat zones identified for the species
Band-tailed pigeon	WCSLI	Coniferous or mixed coniferous forests	Documented foraging near agricultural fields, wetlands, and river bars in the vicinity of the Sumas River all summer Also documented to use a mineral spring site in an abandoned gravel pit near East Pole Road.
Mink (*mustela vison*)	WCSLI	Associated with wetlands and streams	Mink are likely fairly common throughout the project area
Pileated woodpecker	WCSLI	Mature forests with snags and woody debris	Present within forested areas of the project vicinity
Trumpeter swans	WCSLI	Agricultural fields Shores of inland lakes	Use farm fields as wintering areas near two sites, one just northeast of the Everson City limits and the other northwest of the intersection of Noon and East Pole Roads
Great blue heron	WCSLI	Rivers, marshes, ditches	Common in the area and likely forage along proposed project activity areas No nesting areas are near where the project activities would occur

FT- Federally threatened species
SC- State candidate species
FC- Federal candidate species
FSC- Federal species of concern
WCSLI- Whatcom County Species of Local Interest
Transmission[1]- within the proposed S2GF to Canadian border electrical transmission line route

Table 3.5-2. Special Status Wildlife Species Evaluated and Found Likely to be Absent within the Proposed Project Area

Species	Status	Key Habitats of Concern	Key Habitat Present within Affected Environment
Cascade frog	FSC	Aquatic, marshes, forested wetlands, small ponds and lakes Elevations above 2000 feet	Project below lower elevation limits of species and outside of reported range
Long-eared myotis	FSC	Roosts in caves, buildings	Foraging habitat and open water is available, however, no prime roosting or hibernating habitat is present within areas that would be disturbed
Long-legged myotis	FSC	Winter hibernacula in caves and mines	Possible maternity and solitary roosting sites are limited to older trees located in the forests adjacent to the plant site, near the transmission line, and along streams and the Sumas River Caves and mines used for hibernation are not present
Olive-sided flycatcher	FSC	Large forest patches near open areas, burns, or water bodies	Possible nesting in the small forest patches and foraging in forests and open fields near and within the project area
Pacific Townsend's big-eared bat	FSC, SC	Only roost from walls and ceilings Requires large open space for flight in the roost	No typical roost sites (caves, mines, or old abandoned buildings) are available in the project area Foraging and drinking opportunities are the same as for long-eared bats
Tailed frog	FSC	Inhabit cold, rocky mountain streams in the Cascade and Olympic Mountains	Streams are not suitable for this species (requires rocky-bottomed mountain streams)
Sandhill crane	WCSLI	Open habitats, fields, large marshes, and shallow water marshes with emergent vegetation	Farm fields between Squaw Creek and the Kamm Ditch, about a mile west of Transmission[1] and a mile south of Transmission[2], as a staging area for spring migration
Black-crowned night heron	WCSLI	Nest trees near water Wooded swamps and ponds	Project area is outside of documented distribution range

SC- State candidate species
FSC- Federal species of concern
WCSLI- Whatcom County Species of Local Interest
Transmission[1]- within the proposed S2GF/Bellingham electrical transmission line route
Transmission[2]- within the proposed S2GF to Canadian border electrical transmission line route.

Table 3.5-3: Waterway Crossing Locations

Waterway Name[1]	Stream Crossing Numbers[2]	Stream Numbers[3]	Tributary to[4]	Associated Wetlands[5]	RM[6]	Number of Nearest Proposed Poles(s)[7]
S2GF/BELLINGHAM OVERHEAD TRANSMISSION LINE WATERWAY CROSSINGS						
Squalicum Creek Basin						
Squalicum Cr.	A-S1	0552	Bellingham Bay	A-W1[P]	6.2	North of 0/6
Unnamed Cr.	A-S2	0561	Squalicum Cr.	A-W2	0.4	West of 0/14
Unnamed Cr.	A-S3	0562	0561	A-W3	0.3	South of 1/12
Unnamed Cr.	A-S4	0561	Squalicum Cr.	A-W4	1.2	1/15-2/1
Unnamed Cr.	A-S5	0564	0561	A-W5	0.3	West of 2/8
Unnamed Cr.	A-S6	0561	Squalicum Cr.	A-W6	1.5	2/10-2/11
Unnamed Cr.	A-S7	0561	Squalicum Cr.	A-W8	2.5	3/12-3/13
Nooksack River Basin						
Tenmile Cr.	A-S8	0163	Nooksack R.	A-W9	13.2	5/1-5/2
Unnamed Cr.	A-S9	0187	Tenmile Cr.	A-W11	2.2	5/14-1/15
Ditch	AS10	0183	Green Lk. to 0181	NONE	4.8	9/5-9/6
Ditch	A-S11	0183	Green Lk. to 0181	NONE	5.6	10/4-10/5
Ditch	A-S12	0221	0220 to 0217	NONE	1.7	10/8-10/9
Ditch	A-S13	0217	Nooksack R.	NONE	2.9	12/6-12/7
Ditch	A-S14	0217	Nooksack R.	NONE	4.0	S of 11/5*
Nooksack R.	A-S15	0120	Bellingham Bay	A-W14c&d	20.1	13/15-14/1
Nooksack R.	A-S16	0120	Bellingham Bay	A-W14a&b	20.9	11/5-12-1*
Ditch	A-S17	NA	ditch associated with crossing A-S18	None	0.9	North of 14/15
Ditch	A-S18	NA	Nooksack R.	None	0.9	South of 15/1
Sumas River Basin						
Johnson Cr.	A-S19	NA	Sumas R.	A-W17.5	7.3	17/8-17/9
Johnson Cr.	A-S20	NA	Sumas R.	A-W18	7.1	17/11-17/12
Johnson Cr.	A-S21	NA	Sumas R.	A-W19	6.5	18/3-18/4
Unnamed Cr.	A-S22	NA	Johnson Cr.	None	0.3	North of 18/7
Johnson Cr.	A-S23	NA	Sumas R.	None	5.7	18/15-19/1

Waterway Name[1]	Stream Crossing Numbers[2]	Stream Numbers[3]	Tributary to[4]	Associated Wetlands[5]	RM[6]	Number of Nearest Proposed Poles(s)[7]
Squaw Cr.	A-S24	NA	Johnson Cr.	A-W21	0.1	19/11-19/12
Unnamed Cr.	A-S25	NA	Johnson Cr.	A-W21.6	0.2	19/16-20/1
N.F. Johnson Cr.	A-S26	NA	Johnson Cr.	A-W22	0.2	20/10-20/11
Johnson Cr.	A-S27	NA	Sumas R.	A-W23	4.3	East of 21/1
Unnamed Cr.	A-S28	NA	Johnson Cr.	A-W25	0.3	West of23/11
Bone Cr.	A-S29	NA	Sumas R.	A-W26	1.2	22/12-22/13
Bone Cr.	A-S30	NA	Sumas R.	A-W27	1.5	South of 23/6
Johnson Cr.	A-S31	NA	Sumas R.	A-W28*	1.9	23/12-23/13
S2GF/CUSTER OVERHEAD TRANSMISSION LINE WATERWAY CROSSINGS						
California Creek Basin						
Ditch	B-S1	0069	California Cr.	B-W2	2.4	1/11-1/12
Ditch	B-S2	0068	California Cr.	NONE	1.4	Southeast of 2/2
Ditch	B-S3	NA	0068	B-W3	0.2	Northwest of 2/4
Ditch	B-S4	0066	California Cr.	NONE	3.9	South of 2/13
Dakota Creek Basin						
Unnamed Cr.	B-S5	0037	S.F. Dakota Cr.	B-W5	0.7	4/5-4/6
S.F. Dakota Cr.	B-S6	0002	Dakota Cr.	B-W6	5.9	North of 4/10
Unnamed Cr.	B-S7	0042	S.F. Dakota Cr.	B-W6.6	1.6	8/2-8/3
S.F. Dakota Cr.	B-S8	0002	Dakota Cr.	B-W7	10.4	West of 8/9
Nooksack River Basin						
Bertrand Cr.	B-S9	0201	Nooksack R.	B-W9	6.0	East of 11/2
Double Ditch/Pepin Cr.	B-S10	0211	Fishtrap Cr.	NONE	2.8	West of 12/11
Ditch	B-S11	0213	Fishtrap Cr.	B-W9.5*	1.2	East of 14/14
Fishtrap Cr.	B-S12	0210	Nooksack R.	B-W10	8.0	15/10-15/11
Sumas River Basin						
Ditch	B-S13	NA	Pangborn Lk.	B-W10.5*	5.5	19/9-19/10

Waterway Name[1]	Stream Crossing Numbers[2]	Stream Numbers[3]	Tributary to[4]	Associated Wetlands[5]	RM[6]	Number of Nearest Proposed Poles(s)[7]
Ditch	B-S14	NA	Johnson Cr.	NONE	0.2	West of 23/10
S2GF TO CANADIAN BORDER OVERHEAD TRANSMISSION LINE WATERWAY CROSSINGS						
Sumas River Basin						
Sumas Cr.	C-S1	NA	Chilliwack R.	C-W1	0.4	NA
S2GF TO CANADA SEWER LINE WATERWAY CROSSINGS						
Sumas River Basin						
Sumas Cr.	S-S1	NA	Chilliwack R.	S-W1	0.2	NA
S2GF TO CANADA GAS LINE WATERWAY CROSSINGS						
Sumas River Basin						
Johnson Cr.	G-S1	NA	Sumas R.	A-W28	1.9	NA
Bone Cr.	G-S2	NA	Sumas R.	L	0.9	NA
Sumas R.	G-S3	NA	Chilliwack R.	I	3.0	NA

1. Ditch number 0217 and the Nooksack River are crossed by a Preferred Route at crossings S-14 and S-16 and an Alternative Route at crossings S-13 and S-15.
2. Sumas Energy 2 et al. (2000) stream crossing number. Crossings A-S31 and G-S1 are at the same location on Johnson Creek.
3. Stream numbers (in parenthesis) are taken from the 1981 Washington Department of Fisheries publication, *A Catalog of Washington Streams and Salmon Utilization, Vol. 1, Puget Sound* (Williams, W.R., editor) by Ames, J.J. and P. Bucknell. These numbers apply to Watershed Resource Inventory Area (WRIA) 01, which includes all streams in the California Creek, Dakota Creek, Squalicum Creek, and Nooksack River basins. The Sumas River basin is also in WRIA 01, but was not included in the 1981 Ames and Bucknell publication, so stream numbers are not available to assign to transmission line crossings in this basin.
4. The ditch at Transmission Line Crossing A-S17 is a tributary of the ditch at Transmission Line Crossing A-S18.
5. Wetlands associated with transmission line crossings of streams are identified by a Dames & Moore wetland number. Wetland A-W1, the only wetland that provides fish rearing habitat is marked with a superscript "P."
6. The location of each waterway crossing is given in River Miles (RM) obtained from the Williams, et al., 1975. Several ditches not mapped in Williams, et al., 1975 were not assigned stream numbers and were given approximate RM locations. The Sumas River basin was not included in Williams, et al., 1975 and, as a result, Sumas River basin crossings are also assigned approximate RMs
7. Proposed transmission line pole locations as shown on alignment sheets (B&V 1999a and B&V 1999b). Pole locations marked with an asterisk (*) near stream crossings A-S14 and A-S16 are from additional alignment sheets added to B&V 1999a for the preferred alternative crossing of the Nooksack River at crossing A-S16 (the corner of Noon Road and Abbott Road, across Nooksack River to end of Notter Road). All other pole locations given are for crossing A-S15 of the Nooksack River (end of Polinder Road, across Nooksack River to the corner of Timon Road and Northwood Road).

3.5.2.3 S2GF Site

The S2GF site has undergone intense agricultural activity and artificial drainage with ditches and drain tile. The majority of the site (27.5 acres) is idle cropland that has produced corn and possibly other crops. Open cropland is common in the area and is used for foraging by many species of wildlife.

Waterfowl are expected to use the site during migration and wintering periods. The site is likely used by foraging red-tailed hawks and northern harriers, which feed on small mammals (e.g. voles, moles, and mice) and snakes common within croplands. Bald eagles may also occasionally use the site for foraging. Pacific tree frogs are expected to be common in this area and likely use the field during spring for courtship and feeding. Drainage ditches and nearby wetlands are likely to be used by Pacific tree frogs for breeding. American crows are also common in the area and are likely to use the site.

The 8.8-acre forested wetland immediately west of the proposed site (see Section 3.4) provides habitat suitable for amphibians, as well as a variety of breeding birds. Red-tailed hawk are expected to occasionally perch within the cottonwoods, and bald eagles may perch in this location as well.

3.5.2.4 Natural Gas Pipeline

The gas and transmission line corridors lie almost entirely in existing easements that have been previously cleared as road ROW or to accommodate existing sewage and water lines. As a consequence, the upland vegetation in both corridors is subject to occasional or regular maintenance in the form of mowing, trimming, and/or chemical treatment.

While forested lands occur in the region, the easements in which the transmission lines are to be located have been cleared and in most cases provide adequate space for the construction and operation of the lines. The existing vegetation in these areas is typically composed of shrubs, grass, and herbaceous vegetation. The following is a brief description of the vegetation communities occurring in or immediately adjacent to the plant site, gas line, and transmission corridors.

The natural gas pipeline route is mapped in Figure 3.4-2. Wetland and waterway locations are also mapped in this figure. Wetland locations along the proposed corridor are described in Appendix C.

The majority of the proposed natural gas lines would be constructed within agricultural areas dominated by corn and hay fields. Wildlife use is expected to be similar to that described for the plant site.

The natural gas pipeline route would cross under Johnson Creek, Bone Creek, and the Sumas River at crossings G-S1, G-S2, and G-S3. Waterway locations along the proposed corridor are given in Table 3.5-3. Fish presence and fisheries habitat at waterway crossings are described in detail in Appendix E.

These stream crossings occur in agricultural fields with reed canarygrass the dominant streambank vegetation. A 10- to 30-foot-wide hedge of Himalayan and evergreen blackberry starting approximately five to ten feet from the edge of the channel lines the edge of the streams. A small amount of canopy cover is provided by scattered deciduous trees such as red alder, big-leaf maple, paper birch, and willows occurring primarily as individuals or small patches.

Deciduous trees are found in scattered patches along Johnson Creek, Bone Creek, and the Sumas River. Red alders and a big-leaf maple border Johnson Creek at the natural gas pipeline crossing location. Pacific willow, Scouler's willow and red alder provide habitat and cover at the Bone Creek crossing location. Trees found near the Sumas River crossing include paper birch and pacific willow.

These streams and the Sumas River provide resting, breeding, cover, and foraging areas for a variety of waterfowl, songbirds, raptors, mammals, amphibians, and fish.

One salmonid Evolutionarily Significant Unit (ESU) and one salmonid Distinct Population Segment (DSP) in the project area have been listed as threatened under the Endangered Species Act (ESA). These are the coastal/Puget Sound bull trout DPS and the Puget Sound chinook salmon ESU. In addition, the Puget Sound coho salmon ESU is a candidate for federal listing and Pacific lamprey and river lamprey are federal species of concern. The status of both species of lampreys in the project area is unknown, but they may occur in all streams crossed by the natural gas pipeline.

The channel of Johnson Creek at the pipeline crossing is approximately 16 feet wide and two feet deep at normal high water with a substrate composed of approximately 10 percent gravel and 90 percent sand. The creek has less than a one percent gradient. Johnson Creek had a three to four cubic feet/second (cfs) flow of clear water at the time of the survey and juvenile salmonids were observed. The creek flows through numerous channels separated by aquatic vegetation. Undercut banks provide good habitat for rearing salmonids. Coho salmon, chum salmon, steelhead trout, and coastal cutthroat trout spawn in the headwaters of Johnson Creek and rear in the area of the pipeline crossing. Johnson Creek is one of the major coho salmon producers in the Sumas River basin. Both resident and sea-run forms of coastal cutthroat trout are found in Johnson Creek. Bull trout and Dolly Varden may enter the Sumas River basin, but water temperatures are probably too high for reproduction to occur (Kraemer 1998). Bull trout and Dolly Varden are managed as "native char" by the Washington Department of Fish and Wildlife.

Bone Creek may provide habitat for coho salmon and coastal cutthroat trout, but at the time of the survey, no flow was present at the site of the pipeline crossing. The water in the four-foot-wide channel was approximately one foot deep, stagnant, and completely covered with duckweed. The substrate of the stream is composed of fine organic debris. No fish were observed at the time of the survey.

The channel of the Sumas River at the pipeline crossing was approximately 20 feet wide and one to two feet deep at the time of the survey with a substrate composed of sand and

silt. The river has less than a one percent gradient. The streambanks slope gradually with no undercutting, the streambed is heavily graded with little channel complexity, and there is no large woody debris to add structure. No fish were observed at the time of the survey and it is unlikely that this portion of the river provides spawning or rearing habitat for salmonids. Coho salmon, chum salmon, steelhead trout, and cutthroat trout use this section of the river as a migration corridor between spawning and rearing areas and for smolt migration. Native char and lamprey may also use this reach as a migration corridor.

3.5.2.5 Sewer and Water Pipelines

An existing water pipeline would be used except for one 300-foot segment from Front Street to Bob Mitchell Avenue, and a second segment to connect the plant site with the existing water pipeline parallel to Bob Mitchell Avenue. The sewer pipeline is to be installed parallel to existing paved city roads. The sewer line is mapped in Figure 3.4-2.

Because the proposed water and sewer pipelines would be installed in previously disturbed areas, wildlife habitat and species present are those common throughout the area. Affected areas would be located along road shoulders and adjacent to pasture and cropland, residential lawns, and other developed areas. No habitats or species of local concern are present within construction and/or operational areas.

The sewer pipeline route crosses Sumas Creek at crossing S-S1 near the railroad grade along railroad street, north and east of the proposed plant site. This crossing is mapped in Figure 3.4-2. This creek has the least disturbed riparian buffer and the greatest density of deciduous trees when compared to the other stream crossings. This stream is bordered at the crossing locations by red alders and various willows. Wildlife use of this creek is similar to that of the streams crossed by the natural gas pipeline.

The channel of Sumas Creek at the crossing is approximately six feet wide and one foot deep with a substrate composed of approximately 15 percent gravel and 85 percent sand. The creek has less than a one percent gradient and contains a moderate amount of large woody debris. Approximately 30 percent of the creek is pool habitat, with a good degree of channel complexity present. Sumas Creek had a flow of three to four cfs of clear water at the time of the survey, and coho salmon and coastal cutthroat trout were observed. This stream has the best quality salmonid spawning and rearing habitat in the project area. Steelhead trout and native char may also use the creek.

3.5.2.6 230 kV Electrical Transmission Line to Canada

This ½-mile-long route is situated along existing roadways and other developed areas and contains no habitat nor species of local importance. Wildlife use is likely limited to very common species, due to the disturbed nature.

The ½-mile route crosses Sumas Creek north of the S2GF site. This creek has the one of the least disturbed riparian buffers and highest density of deciduous trees of all the stream crossings associated with the proposed transmission lines. This stream is bordered at the

crossing locations by red alders and various willows. Wildlife use of this creek is similar to that of the streams crossed by the natural gas pipeline.

The channel of Sumas Creek at the crossing is approximately six feet wide and one foot deep with a substrate composed of approximately 15 percent gravel and 85 percent sand. The creek has less than a one percent gradient and contains a moderate amount of large woody debris. Approximately 30 percent of the creek is pool habitat, with a good degree of channel complexity present. Sumas Creek had a flow of three to four cfs of clear water at the time of the survey, and coho salmon and coastal cutthroat trout were observed. This stream has the best quality salmonid spawning and rearing habitat in the project area. Steelhead trout and native char may also use the creek.

3.5.2.7 115 kV transmission Line – S2GF/Bellingham Route

The primary area of concern for wildlife habitat along this route is the crossing of the Nooksack River, which contains relatively important riparian habitat that is used by a variety of wildlife species, including bald eagle (see Table 3.5-1).

The primary area of concern for fish habitat is the crossing of 31 waterways and three watersheds (Squalicum Creek, Nooksack River, and Sumas River). Twenty-two of these waterways probably contain fish during at least a portion of the year and are accessible to anadromous fish. Coastal cutthroat trout and coho salmon use all 22 of these streams. These stream crossings are described in Table 3.5-3 and Appendix E. Most of these streams are excavated and have limited habitat value for salmonids. Little stream structure or overhead canopy exist and the channels are choked with encroaching reed canarygrass. Many of the crossings occur at the extreme headwaters of these streams where little spawning or rearing habitat is available and the stream channels are excavated and ditch-like. However, Squalicum Creek, Johnson Creek, the north fork of Johnson Creek and the Nooksack River provide considerable medium to high quality spawning and rearing habitat for anadromous salmonids.

Squalicum Creek drains into Bellingham Bay. The channel is excavated in the vicinity of the crossing with a sand and silt substrate and a beaver pond impounding the stream approximately ten feet above the crossing. A gravel and cobble substrate is present in Squalicum Creek above and below this pond, with a pool/riffle structure present (30 percent pool, 70 percent riffle). All but one of the tributaries crossed by the electrical transmission line are excavated channels with silt substrates or dry channels. Tributary 0562 has a gravel and cobble substrate above the transmission line crossing and appears to provide good habitat for coho salmon and coastal cutthroat trout. Below crossing A-S1, Squalicum Creek also receives runs of chum salmon and steelhead trout. Hatchery fall-run chinook salmon have occasionally been planted in Squalicum Creek and the creek provides habitat for sculpins, lamprey, and other fish species.

The lower mainstem of the Nooksack River in the vicinity of crossings A-S15 and A-S16 provides spawning habitat for fall/summer-run chinook salmon, chum salmon, steelhead trout, and pink salmon. Coho salmon and coastal cutthroat trout, plus some chum and

pink salmon use the tributaries entering along this stretch of river for spawning. Juvenile salmonid rearing occurs throughout the river and the river also serves as a migration route for runs of trout and salmon (fall/summer-run chinook, spring-run chinook, chum, pink, and coho salmon; bull trout and Dolly Varden; and summer-run steelhead trout, winter-run steelhead trout, and sea-run coastal cutthroat trout). The river also supports a run of eulachon in its lower reaches and such resident fish as largescale sucker, mountain whitefish, northern pikeminnow, three-spine stickleback, dace, sculpins, and lampreys (Wydosky and Whitney 1979, Castle 1998, Hendrick 1999, Nielsen 1973-99). Large areas of riparian trees, dominated by large mature black cottonwoods, are found near the river banks. The river is a popular winter feeding habitat for bald eagles and eagle nests occur in large cottonwood trees near the river banks. An eagle nest occurs within one mile of crossing A-S16. The river also provides habitat for migratory and resident waterfowl and a corridor for wildlife migration.

Johnson Creek is a tributary of the Sumas River, which drains north into the Fraser River. The Sumas River in the vicinity of the project area has poor salmonid habitat as described earlier. The river primarily serves as a migration corridor for anadromous salmonids that spawn and rear in tributary streams, such as the Saar River and Johnson Creek.

Johnson Creek is the only significant salmonid stream in the Sumas River basin crossed by the project's electrical transmission lines. Most of the transmission line crossings of Johnson Creek occur in low quality habitat where the stream channel is excavated, slow moving, with a silt substrate and no canopy cover or instream structure. The riparian vegetation in these areas is dominated by reed canarygrass and blackberries. The lower crossing (A-S31) described earlier as G-S1 has good quality rearing for juvenile salmonids. The other crossings are highly excavated and choked with reed canarygrass with the channel all-but-hidden. The majority of Johnson Creek in the project area is used by anadromous salmonids as a migration corridor to the north fork of Johnson Creek (A-S26). This stream has a riparian zone dominated by deciduous forest (red alder and big-leaf maple). The channel is 10-12 feet wide and 1-3 feet deep with a 50/50 ratio of pool to riffle. The substrate is dominated by gravel and numerous juvenile coho salmon and cutthroat trout were observed during field surveys. Coho salmon and coastal cutthroat trout are the dominant salmonids using this stream for spawning and rearing habitat with some use by winter-run steelhead trout and chum salmon. Agricultural runoff into the north fork of Johnson Creek has caused significant fish kills in the past (Hendrick 1999).

All of the stream crossings along the transmission line corridors provide habitat for amphibians, reptiles, mammals, and birds associated with aquatic environments. The vegetation along these waterways provides habitat connectivity between regions of high quality habitat. Slow moving excavated channels that do not support fish populations frequently provide excellent habitat for tadpoles and salamander larvae. These excavated channels near agricultural fields also provide habitat for resident and migrating waterfowl.

3.5.2.8 115 kV Transmission Line – S2GF/Custer Route

Only common wildlife habitats are present along this 24-mile route, which is situated within roadway shoulders containing mostly grasses and are regularly mowed.

The route does cross 14 waterways. Five of these waterways (crossings B-S 3, 4, 5, 13, and 14) were dry channels or ditches that did not contain fish (or water for most of the season). Four of the waterways were ditches with limited rearing habitat and potential access to anadromous fish (crossings B-S 1,2, 10, and 11). The remaining five crossings occur at the south fork of Dakota Creek (two crossings), Fishtrap Creek, Bertrand Creek, and Pepin Creek/Double Ditch.

The south fork of Dakota Creek is a tributary of Dakota Creek, an independent watershed draining into Drayton Harbor in Semiahmoo Bay. The upper crossing (B-S8) of the south fork of Dakota Creek is an ephemeral channel at the extreme headwaters of the stream that may provide habitat for salmonid during wet portions of the year. The lower crossing (B-S6) of the south fork of Dakota Creek located in a large wetland dominated by reed canarygrass and Himalayan blackberry. The channel is excavated and approximately 60 feet wide and 3 feet deep with a silt substrate and very little current. No pool or riffle habitat was observed in the vicinity of the crossing. Most of the channel above and below the crossing was covered by reed canarygrass and duckweed and no fish were observed in the portion of the channel close to the road. The south fork of Dakota Creek contains resident coastal cutthroat trout, winter-run steelhead trout, coho salmon, and chum salmon. It may also provide habitat for other fish, such as sculpins, dace, Pacific lamprey and brook lamprey. The quality of salmonid spawning and rearing habitat at the lower and upper crossings is poor, but there may be better quality habitat available to fish between the two crossings.

Bertrand Creek (crossing B-W9) is a large tributary of the lower Nooksack River. The channel at the crossing is approximately 95 feet wide and 1 to 2 feet deep with moderate current over a silt and sand substrate with patches of cobble and gravel. No fish were observed during field visits. The riparian zone consists primarily of a deciduous forest dominated by red alder, vine maple, salmonberry, and Himalayan blackberry. Bertrand Creek contains runs of coho and chum salmon in the vicinity of the crossing and pink salmon occasionally use the lower section of the creek. The stream also contains coastal cutthroat trout, rainbow trout, sculpins, lamprey, and other fish species. Hatchery fall-run chinook salmon have been planted in past years. Spawning and rearing habitat is available in the vicinity of the crossing and the stream is an important salmon producer in the lower Nooksack basin.

Fishtrap Creek is a medium sized tributary of the lower Nooksack River. The channel at the crossing is excavated and approximately 14 feet wide and 1 to 3 feet deep. The substrate is gravel and cobble and the dominant vegetation is reed canarygrass and blackberries. A single juvenile salmonid was observed during a field visit. The stream contains coastal cutthroat trout, coho salmon, and steelhead trout. Chum salmon occasionally spawn in the lower portion of the creek and plants of hatchery fall-run chinook salmon have occurred in the past. Some spawning and rearing habitat is

available in the vicinity of the crossing, but the lack of canopy or instream structure reduces the stream's value for salmon habitat in the area of the crossing.

Pepin/Double Ditch Creek are twin ditches that run on opposite sides of Double Ditch Road. They drain into the lower Nooksack River. The channels are excavated and about 4 to 8 feet wide and 1 to 2 feet deep with a sand and silt substrate with some patches of gravel. No canopy cover or instream structure is present. No fish were observed during surveys and the banks of the ditches are dominated by reed canarygrass. These ditches are excavated stream channels and are accessible to anadromous fish. Coastal cutthroat trout and coho salmon may use what little habitat is available in these ditches for spawning and rearing.

3.5.3 Environmental Impacts of Proposed Action

3.5.3.1 Construction

S2GF Site

Wildlife

The proposed S2GF would be placed on an existing agricultural field and a wetland area dominated by reed canarygrass. Developed areas within the site would result in the permanent loss of 27.5 acres of agricultural land.

This loss would reduce habitat for the wildlife species identified in section 3.5.2.3 (Existing Conditions), but, since this habitat is abundant in the area, the overall impact would not significantly affect populations. Wildlife species and habitats that would be lost include: waterfowl migration and wintering habitat; hawk and owl foraging; and Pacific treefrog courtship, breeding, and foraging habitat.

Fish

The S2GF would be placed on an existing agricultural field and a ditch with a seasonal connection to Johnson Creek. Although fish may enter this ditch during periods of high flow in Johnson Creek, high temperatures would prevent use of this channel for an extended period. Therefore, loss of this ditch during construction would not result in a loss of fish habitat.

Any construction requiring vegetation removal and grading has the potential for water quality impacts. However, runoff from the proposed plant site would be detained and treated prior to discharge. The methods for stormwater pollution prevention discussed in Section 3.2 are expected to prevent degradation of surface waters that would be harmful to fish or fish habitat. Overall impacts to fisheries resources would not be significant because no loss of spawning or rearing habitat for fish would occur and pollution of runoff from construction areas would be prevented.

Natural Gas Pipeline

Wildlife

Approximately 40 acres of agricultural land, including an estimated 26,160 square feet of wetlands, would be temporarily impacted over a 4.1-mile ROW due to installation of the pipeline. Wetland impacts within or along the proposed natural gas pipeline corridor are described in Appendix C.

Pipeline installation would temporarily disturb common wildlife habitat types and species. Since no large trees would be removed, impacts to nest sites would be avoided. Eagle nests and other species/habitats of local importance are sufficiently distant to not be disturbed by the proposed action. Habitat values would return to existing levels within about five years following installation of the pipeline. Eagles and trumpeter swans that frequent local fields in late winter would avoid the construction zone and use other areas.

Impacts to the Johnson Creek, Bone Creek, and the Sumas River riparian areas would be avoided by boring under them to install the natural gas pipeline.

Fish

Impacts to the Johnson Creek, Bone Creek, and the Sumas River riparian areas and instream habitat would be avoided by drilling under them to install the natural gas pipeline. Best Management Practices (BMPs) would be followed to avoid spills of drilling lubricant (bentonite) into the stream through fractures in the soil or rock while boring under waterways. Although it is impossible to completely avoid the possibility of a fracture and spill of bentonite, crossings would be surveyed before drilling to assess the stability of the substrate. Crossings would be bored at an adequate depth below the surface of the streambed to prevent the release of bentonite into the streambed or water.

Except for the slight possibility of a release of bentonite, no loss of fisheries or aquatic habitat would occur. In the event of a bentonite spill, drilling operations will be immediately stopped and the spill contained as quickly as possible. Drilling operations would not resume until the spill is contained and the leakage controlled. No spawning gravel occurs near or below the crossings and stream substrates consist mostly of fine organic sediments. Fisheries impacts from bentonite-related turbidity increases would be limited to a short-term reduction in feeding success or the temporary suspension of upstream migration of adult salmonid spawners (less than a day). Bentonite could be removed from sediments if a large area of substrate is affected. BMPs used in directional drilling construction to prevent spills of drilling lubricant and subsequent water quality problems are discussed in Section 3.2.

Water/Wastewater Pipelines

Wildlife

Since the installation of water/wastewater pipelines would occur along existing and maintained pipeline or along road shoulders, impacts on wildlife would be minimal. No key habitats would be impacted, and, as with the natural gas pipeline impacts, habitat values would soon return to pre-project levels following construction.

The sewer pipeline is approximately 0.86 miles in length and is to be installed parallel to existing paved City roads. Work areas would be set up from the road pavement edge to ten feet out from the pavement edge. About one acre of grass or unvegetated road shoulder would be temporarily impacted during construction. No trees would be removed during construction. While installing the sewer line, impacts to the Sumas Creek riparian area would be avoided by boring under the 60-inch culvert beneath Second Street that Sumas Creeks runs through.

Fish

Impacts to the Sumas Creek riparian area would be avoided by boring under the 60-inch culvert beneath Second Street to install the sewer line. Boring under the culvert would prevent the possibility of a bentonite spill through a fracture in the substrate. No loss of fisheries or aquatic habitat would occur.

230 kV Electrical Transmission Line to Canada

Wildlife

The 230 kV transmission line to the Canadian border would be placed within existing street and railroad ROWs. Approximately 330 square feet of land would be disturbed to place the 11 poles used for the proposed transmission line to the Canadian border. Poles for the 230 kV line would typically be 100 feet tall, requiring tree trimming between 25 feet and the top of the poles. One footing would be located near the edge of a PSS wetland and another footing would be located in the buffer of a palustrine emergent (PEM) wetland. The part of the wetland and wetland buffer where the footings would be placed are in the process of being permitted for filling as part of different, unrelated projects. No significant wildlife habitat would be affected by the footings of this transmission line.

Impacts to deciduous forests would be limited to the potential removal of some trees along the transmission line corridor and the removal of tree limbs where these limbs would interfere with the new transmission line located along existing roads and railroad ROWs. This limb removal should have little to no impact on wildlife use of these forests. Limbs that fall into wetland areas would be left in place to provide wildlife habitat. Trees less than 25 feet in height may remain, and pole placements have been adjusted to avoid impacts to mature trees and wetlands. In a "worse case scenario," a maximum number of approximately forty trees may be removed along the 0.52-mile transmission line route.

These could include one mature and three immature cottonwoods, four bitter cherries, two paper birches, fourteen red alders, one Scouler's willow, nine Pacific willows, and five Oregon ash trees. The area of potential removal of trees is heavily wooded and the removal of tree limbs described above would not significantly impact wildlife habitat. The removal of the maximum number of trees would have a slight impact on wildlife habitat along the transmission line. There is a potential to impact nesting birds if removal occurs during the nesting season. The impacts of tree removal would be minimized by cutting trees after fledglings have left their nests. Birds and wildlife displaced by tree removal would move into adjacent areas of similar habitat.

Fish

The electrical transmission line would be placed over Sumas Creek within an existing railroad ROW, without disturbing the streambank or stream channel. No loss of fisheries or aquatic habitat would occur. However, one red alder (15 inch diameter at breast height or dbh) and three bitter cherry trees (5 inch dbh) may require removal on the south riparian buffer of Sumas Creek. The loss of these four trees would allow additional sunlight penetration. The additional sunlight would eventually increase the density of understory shrubs, partially mitigating for the loss of canopy cover. The small amount of canopy lost would not cause a significant increase in stream water temperature or reduction in potential large woody debris (LWD).

Whatcom County 115 kV Transmission Lines (Two Routes)

The two Whatcom County 115 kV transmission line routes are almost entirely located within cleared easements that follow roads or railroads. As such, impacts to existing vegetation and wetlands would be minimal. Trees in forested areas alongside existing distribution lines have been previously cleared or trimmed. Most wetlands within and adjacent to the corridor have been degraded by agricultural practices and many are dominated by nonnative, invasive plant species. In addition, pole placements have been adjusted to avoid impacts to mature trees, wetlands, and stream riparian buffers. Direct disturbance would occur mainly in previously disturbed areas, such as filled and graded areas with little or no vegetation and roadside shoulders with regularly maintained herbaceous vegetation. For the majority of the routes (90 percent), existing 35- to 45-foot distribution line poles would be replaced with transmission line poles approximately 70 to 80 feet tall. The existing poles would be removed prior to new pole installation. Since the new poles are much taller than the existing poles, portion of trees in the corridor that were normally left untrimmed would now have to be trimmed. Trimmed material and tree trunks would be typically left on the ground in naturally vegetated areas to provide wildlife habitat.

The two 115 kV transmission lines are shown in Figure 3.4-4. Wetland and waterway crossing locations are included in this figure, along with areas of new transmission lines and areas of tree removal or trimming. Many of the trees to be removed or trimmed along the transmission routes are yard trees or windbreak strips near residences or farm

buildings. These individual trees are not mapped, however, a more complete description of tree removal and trimming activities can be found in Appendix C.

The electrocution of raptors is precluded by the design of the project's transmission lines. The large spacing of the transmission lines prevents contact with both phases by large birds landing on the lines.

115 kV S2GF/Bellingham Transmission Line

This 115 kV route is about 24 miles long with about 1.3 miles of new transmission line (5.3 percent of the total length). The impacts to upland vegetation and wetlands are described in Appendix C.

Wildlife. The majority of this route would be located on the shoulders of roads or in abandoned railroad grades, with the following exceptions: 240 linear feet of new transmission line through mixed deciduous/conifer forest; 330 linear feet (preferred route) or 483 linear feet (alternative route) through Nooksack River riparian forest; 825 linear feet (preferred route) or 390 linear feet (alternate route) above the Nooksack River channel; and 90 linear feet through scrub/shrub habitat. Transmission line poles would be placed in filled and graded shoulder or roadside ditches. Construction equipment would remain on the road and approximately 30 feet of road shoulder habitat would be temporarily disturbed during the placement of each pole. A total of about 0.22 (preferred route) or 0.23 (alternate route) acres of road shoulder habitat would be temporarily disturbed during the placement of poles. Little to no displacement of wildlife in the narrow corridor of filled and graded shoulder or roadside ditch would occur. No permanent loss of habitat would occur along road shoulders.

About 85 to 86 percent of the transmission line route would be in the vicinity of agricultural lands, with the remaining 12 to 13 percent near mixed forest (primarily deciduous), 1 percent near riparian forest, and 1 percent scrub/shrub habitat. Forest or yard trees that obstruct new transmission lines would be removed or trimmed. Because the new transmission line poles would be about 40-feet higher than existing distribution line poles, additional trimming (or in some instances, removal) would be necessary along the existing transmission line routes. Tree removal or trimming would be necessary along approximately 4,000 linear feet of the transmission route. Most of these trees would be single yard trees or windbreak plantings near roadside residences. A total of approximately 15 to 20 Douglas firs, 1 big-leaf maple, 2 red cedars, 5 red alders, and 6 cottonwoods would be removed. A similar number of trees would have to be trimmed. Except in riparian forest, little to no displacement of wildlife due to tree removal or trimming would occur. If tree removal occurs during the nesting season, birds nesting in trees that are removed or trimmed would be impacted. Because the number or trees removed or trimmed is a small percentage of the available habitat trees in the vicinity of the pipeline, significant impacts to wildlife from tree removal and trimming would not occur, except in riparian forest in the vicinity of the Nooksack River crossings A-S15 and 16. The only tree removal or trimming of riparian trees would be the trimming of a few red cedar and Douglas fir trees in the vicinity of crossings A-S4 and A-S5, and the

removal of five cottonwoods and two Douglas fir trees, and trimming of a few trees at crossing A-S6.

Two alternative crossings of the Nooksack River are presented for this route, as shown in Figure 3.4-4b. The preferred crossing of the Nooksack River at Noon Road would not require tree trimming or removal on the south bank or a mid channel island during construction. A few mature cottonwood trees would have to be removed on the north bank and one very large cottonwood tree trimmed. In contrast, the crossing at Pollinder and Timon Roads would require the removal of at least ten mature cottonwoods on the west bank and trimming of five to ten cottonwoods and Pacific willows on the east bank. Although both crossings are important habitat for bald eagles, there are two bald eagle night roosts on the west bank of the river near the Pollinder/Timon Road crossing and an eagle nest is located on the south bank of the Nooksack River about a third of a mile northwest of the crossing point. To avoid disturbing nesting eagles, construction could not occur at this crossing between January 1 and August 15.

The loss of ten mature cottonwoods at the Pollinder/Timon Road crossing in the vicinity of the eagle roosts would be a long-term impact to a preferred roost site. The disturbance of bald eagles in the vicinity of the crossings by construction noise would be a short-term impact and avoidable by scheduling construction when eagles are not present. The removal of a few mature cottonwood trees from the north bank of the Nooksack River at the Noon Road crossing represents a minimal long-term impact to the availability of bald eagle roost and nest trees, but because the area is not currently used by nesting or roosting eagles and because mature riparian cottonwood forest is relatively common along this reach of the Nooksack River, no significant long-term impacts to bald eagles would occur. Construction at the Noon Road crossing would be scheduled between April 1 and October 30 to avoid impacts to bald eagles in a winter concentration area located along the Nooksack River upstream from the crossing.

Fish. Fisheries impacts at waterway crossings by this transmission line are described in Table 3.5-4. No direct impacts to fisheries or aquatic resources would occur. All waterways crossed by transmission lines would be spanned and poles would not be located in riparian areas. The streambanks and stream channels would not be disturbed and BMPs would be used to avoid or minimize the release of sediment during the placement of transmission line poles. No loss of spawning or rearing habitat would occur. However, the removal of mature cottonwoods from the riparian area of the Nooksack River at both proposed crossings would reduce the potential recruitment of LWD to the Nooksack River. However, because the affected reach of the Nooksack River possesses an intact chain of mature black cottonwood trees, a large source of LWD recruitment remains and the indirect impacts to fisheries habitat are likely to be insignificant.

Table 3.5-4: Fisheries Impacts at Waterway Crossings

Waterway Name[1]	Stream Crossing Numbers[2]	Fisheries Impacts[3]
S2GF/BELLINGHAM OVERHEAD TRANSMISSION LINE WATERWAY CROSSINGS		
Squalicum Creek Basin		
Squalicum Cr.	A-S1	No impact
Unnamed Cr.	A-S2	No impact
Unnamed Cr.	A-S3	No impact
Unnamed Cr.	A-S4	The branches of a few red cedar trees on south riparian buffer will be trimmed.
Unnamed Cr.	A-S5	The branches of a few riparian buffer Douglas fir trees will be trimmed.
Unnamed Cr.	A-S6	Five cottonwood and two Douglas fir trees will be removed from the east riparian buffer and a few cottonwood and birch trees will be trimmed in the west riparian buffer.
Unnamed Cr.	A-S7	No impact
Nooksack River Basin		
Tenmile Cr.	A-S8	No impact
Unnamed Cr.	A-S9	No impact
Ditch	AS10	No impact
Ditch	A-S11	No impact
Ditch	A-S12	No impact
Ditch	A-S13	No impact
Ditch	A-S14	No impact
Nooksack R.	A-S15	Several large mature cottonwood trees will be removed on both banks of the river. Additional cottonwood trees will be trimmed on both banks of the Nooksack River.
Nooksack R.	A-S16	No trimming will be necessary on the south bank during construction. A few mature cottonwood trees will have to be cleared and one very large cottonwood tree trimmed on the north bank during construction. Trimming may have to occur in the future as young cottonwood trees mature on both banks and an island.
Ditch	A-S17	No impact
Ditch	A-S18	No impact
Sumas River Basin		
Johnson Cr.	A-S19	No impact
Johnson Cr.	A-S20	No impact
Johnson Cr.	A-S21	No impact
Unnamed Cr.	A-S22	No impact

Waterway Name[1]	Stream Crossing Numbers[2]	Fisheries Impacts[3]
Johnson Cr.	A-S23	No impact
Squaw Cr.	A-S24	No impact
Unnamed Cr.	A-S25	A few immature red alder trees in riparian buffer will be trimmed.
N.F. Johnson Cr.	A-S26	No impact
Johnson Cr.	A-S27	No impact
Unnamed Cr.	A-S28	No impact
Bone Cr.	A-S29	No impact
Bone Cr.	A-S30	No impact
Johnson Cr.	A-S31	Not more than 3 red alder trees will be removed in the riparian buffer and not more than 3 red alder trees will be trimmed.
S2GF/CUSTER OVERHEAD TRANSMISSION LINE WATERWAY CROSSINGS		
California Creek Basin		
Ditch	B-S1	No impact
Ditch	B-S2	No impact
Ditch	B-S3	No impact
Ditch	B-S4	No impact
Dakota Creek Basin		
Unnamed Cr.	B-S5	No impact
S.F. Dakota Cr.	B-S6	No impact
Unnamed Cr.	B-S7	No impact
S.F. Dakota Cr.	B-S8	No impact
Nooksack River Basin		
Bertrand Cr.	B-S9	No impact
Double Ditch/Pepin Cr.	B-S10	No impact
Ditch	B-S11	No impact
Fishtrap Cr.	B-S12	No impact
Sumas River Basin		
Ditch	B-S13	No impact
Ditch	B-S14	No impact

Waterway Name[1]	Stream Crossing Numbers[2]	Fisheries Impacts[3]
S2GF TO CANADIAN BORDER OVERHEAD TRANSMISSION LINE WATERWAY CROSSINGS		
Sumas River Basin		
Sumas Cr.	C-S1	One red alder tree (15" dbh) and three bitter cherry trees (5" dbh) may be removed on the south riparian buffer. No vegetation will be removed from the north riparian buffer.
S2GF TO CANADIAN BORDER SEWER LINE WATERWAY CROSSINGS		
Sumas River Basin		
Sumas Cr.	S-S1	No impact*
S2GF TO CANADIAN BORDER GAS LINE WATERWAY CROSSINGS		
Sumas River Basin		
Johnson Cr.	G-S1	No impact*
Bone Cr.	G-S2	No impact*
Sumas R.	G-S3	No impact*

[1] Ditch number 0217 and the Nooksack River are crossed by a Preferred Route at crossings S-14 and S-16 and an Alternative Route at crossings S-13 and S-15.

[2] Dames & Moore stream crossing number. Crossings A-S31 and G-S1 are at the same location on Johnson Creek.

[3] Proposed pole locations as shown on alignment sheets (B&V 1999a and B&V 1999b). The waterways will be spanned by transmission lines. Poles will be placed in the shoulder of the road. Poles will not be placed in riparian vegetation and no clearing or filling will occur within riparian vegetation or near the waterway's streambank or channel. Riparian trees that will be removed or trimmed at waterway crossings are noted. An asterisk (*) is used to mark waterway crossings that will be bored.

115 kV S2GF/Custer Transmission Line

The 115 kV S2GF/Custer transmission line route is also about 24 miles in length with approximately three miles of new transmission line (12.7 percent of the total length). Impacts to upland vegetation and wetlands are described in Appendix C.

Wildlife. With the exception of 180 linear feet of new transmission line through agricultural (pasture) land, this transmission line route would be located on the shoulders of roads or in abandoned railroad grades. Transmission line poles would be placed in filled and graded shoulder or roadside ditches. Construction equipment would remain on the road and approximately 30 feet of road shoulder habitat would be temporarily disturbed during the placement of each pole. A total of about 0.25 acres of road shoulder habitat would be temporarily disturbed during the placement of poles. Little to no displacement of wildlife in this narrow corridor of filled and graded shoulder or roadside ditch would occur. No permanent loss of habitat would occur.

About 93 percent of this transmission line route would be in the vicinity of agricultural lands, with the remaining 7 percent near mixed forest (primarily deciduous) or scrub/shrub habitat (4 percent and 3 percent, respectively). Forest or yard trees that obstruct new transmission lines would be removed or trimmed. Because the new transmission line poles would be about 40-feet higher than existing distribution line poles, additional trimming (or in some instances, removal) would be necessary along the existing transmission line routes. Tree removal or trimming would be necessary along approximately 4,000 linear feet of the transmission route. Most of these trees would be single yard trees or windbreak plantings near roadside residences. A total of approximately 40 Douglas firs, 6 paper birches, 8 red cedars, 15 red alders, and 10 cottonwoods would be removed. A similar number of trees would have to be trimmed. Little to no displacement of wildlife due to tree removal or trimming would occur. If tree removal occurs during the nesting season, birds nesting in trees that are removed or trimmed would be impacted. Because the number or trees removed or trimmed is a small percentage of the available habitat trees in the vicinity of the pipeline, significant impacts to wildlife from tree removal and trimming would not occur.

Fish. Fisheries impacts at waterway crossings along this route are described in Table 3.5-4. All waterway crossings crossed by transmission lines would be spanned and poles would not be located in riparian areas. The streambanks and stream channels would not be disturbed and BMPs would be used to avoid or minimize the release of sediment during the placement of transmission line poles. No loss of spawning or rearing habitat would occur. No riparian trees would be removed or trimmed during construction. No impacts to fisheries or aquatic resources are expected.

Endangered Species Act Impacts

In compliance with the Endangered Species Act (ESA), potential impacts to listed species are discussed below.

The project would not have a significant impact on bald eagles. No prime foraging habitat in rivers and streams in the Sumas River basin would be affected because the boring technique would be used for all natural gas line and utility line crossings. No prime foraging habitat in rivers and streams crossed by transmission lines would be affected, because all creek crossings would be spanned and poles would not be located in riparian areas. Most of the recorded nest sites, winter concentration areas, and roosting sites would not be disturbed because they are located at least one mile from all project activities. Impacts are limited to a slight chance of disturbance to individual eagles while perched or foraging in the project area during project construction. This would not affect their survival or reproduction. Construction activities near the two nest sites within a mile of the transmission line routes would not occur between January 1 and August 15. No construction would occur within a mile of the bald eagle winter concentration area between October 31 and March 31. No construction would occur near night roosts when eagles are present. With the exception of construction activities at the Nooksack River crossings, all construction activities would occur in the immediate vicinity of roads where an equivalent level of traffic related disturbance already exists. Transmission line

construction would only take a few days at any one location. Mitigation for potential eagle collisions would include the use of visible markers such as aircraft warning balls to reduce avian mortality in the transmission line ROWs (Hoopes 1992 and Olendorff, et al. 1981). In addition, the thin shield or grounding wires that are responsible for most avian transmission line collisions would not be used for project transmission lines (APLIC 1994). The electrocution of bald eagles, due to landing on a transmission line, is unlikely because the large spacing between the lines prevents contact with both phase by large birds landing on the lines (O'Neil 1988).

Vaux's swifts, their habitat, and their chimney roost in Sumas would not be impacted by the project. The project would not affect their foraging areas and potential roosting and nesting sites. Olive-sided flycatcher habitat would not be affected by the project. No forested areas are to be cleared and only one small agricultural field would be lost at the plant site.

The Cascades frog and tailed frog are extremely unlikely to be found in the project area due to their habitat requirements and known distributions. Prime roosting and hibernacula sites for special status bat species are not found in the project area. There would be no impacts to these species.

Overall impacts to chinook salmon, coho salmon, bull trout, or lampreys would not be significant. Johnson Creek, Bone Creek, the Sumas River and their associated riparian areas would be avoided by boring under them to install the natural gas pipeline. All waterway crossings crossed by transmission lines would be spanned and poles would not be located in riparian areas. The streambanks and stream channels would not be disturbed and BMPs would be used to avoid or minimize the release of sediment during the placement of transmission line poles. No loss of spawning or rearing habitat would occur. The 230 kV electrical transmission line to Canada would be placed over the Sumas Creek crossing within an existing street or railroad ROW, without disturbing the stream channel or banks. Potentially, four small trees would have to be removed at the Sumas Creek transmission line crossing. No loss of spawning or rearing habitat would occur, but a slight reduction in canopy cover would occur. This would not cause any significant reduction in LWD recruitment, stream cover, or increase in stream temperature. Potential water quality impacts associated with construction of the facility are discussed in Section 3.2.

The only other impacts would be the removal or trimming of a few trees at crossings A-S4, 5, and 6 and the removal and trimming of mature cottonwood trees near the Nooksack River crossings of the 115 kV S2GF/Bellingham route. The removal of mature cottonwoods from the riparian area of the Nooksack River at these crossings would reduce the potential recruitment of LWD to the Nooksack River. Because the affected reach of the Nooksack River possesses an intact chain of mature black cottonwood trees, a large source of LWD recruitment remains and impacts to fisheries habitat are likely to be insignificant.

3.5.3.2 Operation

S2GF Site

Operational impacts to wildlife would be similar to the construction impacts described previously. However, there would be no additional displacement of wildlife from the S2GF site after construction is completed and the slight potential of any runoff of turbid water from the site would be greatly reduced after construction, stormwater detention facilities, and revegetation of the site are completed.

ROW Maintenance

The pipeline corridors would be returned to the present agricultural use after construction. After the first agricultural crops are planted on the disturbed land, there would be no further impacts to fish and wildlife.

Sewer and Water Pipelines

The sewer and new water pipelines would only be temporarily impacted by construction and the disturbed areas would return to their original condition within a season of vegetation growth. After revegetation is completed in previously vegetated areas, there would be no further impacts to fish and wildlife.

Electrical Transmission Lines

The construction of transmission lines creates a potential for avian collisions. The majority of avian collisions with transmission lines occurs due to birds not being able to see the thin shield or grounding wires used to protect transmission lines during electrical storms (APLIC 1994). Because electrical storms are infrequent in the northwest, the 230 kV lines would not use grounding wires. However, a similar communications wire approximately twice as thick as a grounding wire would be used. The additional wire thickness is expected to increase visibility, greatly reducing the potential for avian collisions.

The electrocution of raptors, caused by their landing on a transmission line and touching both phases is precluded by the design of the project's 230 kV transmission lines. The large spacing of the conductor wires prevents contact with both phases by large birds landing on the lines (O'Neil 1988).

Disturbance to the areas around the transmission poles would be short term and the land would return to its original condition within a season of vegetation. The only operational impacts would be from maintaining a trimmed 30-foot-wide band above 25 feet for the transmission lines. This type of maintenance would prevent new trees growing under the lines from reaching maturity. With the exception of the riparian crossing at the Nooksack

River, this condition already exists. The growth of cottonwood seedlings in the Nooksack River riparian corridor, particularly those situated on the island within the preferred Noon Road crossing corridor will be prevented from exceeding 25 feet in height. This reduction in the potential of bald eagle nest and roost trees and the potential contribution of LWD to the Nooksack River would not be significant because an intact chain of mature cottonwood trees would remain along this reach of the river.

ESA Impacts

The only potential operational impacts to listed species are those for the Nooksack River crossing discussed in the preceding section. Preventing the growth of cottonwood seedlings into mature trees under the transmission lines would reduce the future availability of roost and nest trees for Bald Eagles and the recruitment of LWD in the Nooksack River channel. These impacts would not be significant because an intact chain of mature cottonwood trees would remain along this reach of the river.

3.5.4 Environmental Impacts of No Action

If no action is undertaken, there would be no impacts to fish and wildlife species or habitat.

3.5.5 Mitigation Measures

3.5.5.1 Construction

S2GF Site

To avoid and reduce impacts to fish from water quality effects, BMPs will be implemented to control and minimize erosion and sedimentation that may occur during construction. BMPs to prevent impacts associated with incidental fuel spills will be implemented to protect surface and groundwater quality. Separate stormwater pollution prevention plans will be prepared as required for construction and operation of the facility. These plans will describe the specific BMPs that will be used to prevent pollution by erosion or contamination of runoff with deleterious substances as described in the ACS (Sumas Energy 2 et al. 2000). BMPs will be consistent with the *Puget Sound Stormwater Management Manual* (Ecology 1992, or as amended) and would include features such as stormwater detention, silt fencing, rock placement where vehicles leave the site during construction, and hydroseeding of the plant site after construction. No additional mitigation measures would be required.

Natural Gas, Sewer and Water Pipelines

Impacts associated with pipeline construction will be avoided, minimized, and rectified. The top 12 inches of topsoil will be removed and reserved for replacement. Grass areas will be re-seeded and agricultural areas would be left in their current condition for cultivation. In all cases, the land will be graded to pre-installation contours. These measures will allow the temporarily disturbed areas to revert to pre-construction condition within a season. Impacts to wetlands will also be mitigated by using the BMPs outlined in Section 3.4 - Wetlands and Vegetation.

Restricting the timing of directional drilling under streams to the in-water work windows determined by WDFW will further minimize the risk of a bentonite spill through a streambed fracture.

Electrical Transmission Lines

The majority (90 percent) of the proposed transmission line corridors would be situated where transmission lines currently exist. These areas typically encompass road shoulder habitat, but also may contain narrow edges of agricultural grassland, agricultural cropland, residential yards, forests, and wetlands. The routes selected avoid most sensitive areas, such as fish and wildlife habitat conservation areas or geologically hazardous areas. Also, a large portion of the S2GF/Bellingham route is placed on the Everson Goshen Road to avoid sensitive areas along Noon Road.

Transmission line construction activity at any one location will only be for a period of a few days. To minimize impacts to wetlands and stream riparian areas, the electrical transmission line poles will be placed in upland areas. Wetlands within the transmission corridors will not be filled or excavated as part of construction. All streams and rivers will be spanned. Some wetlands will be spanned, but most would be adjacent to, but not within the habitat types where poles would be erected. BMPs will be used during construction to prevent discharge of fill material into nearby wetlands. Footing construction areas will be re-seeded as necessary.

Trees must be trimmed in several areas. Tree trimming would occur along approximately 4,000 linear feet of both the S2GF/Custer and the S2GF/Bellingham transmission line routes. However, most of these areas receive regular maintenance in the form of trimming and topping to keep vegetation clear of existing transmission lines. To avoid destroying bird nests, eggs, or young, clearing should be conducted outside of the breeding season. Trimming and topping of trees in wildlife habitat will be conducted in such a way that cut debris incidentally falls into the natural area. This debris would be left in place as wildlife habitat features. However, cut debris will be removed from any stream areas to prevent the obstruction of flow through culverts.

For the Nooksack River crossing, trimming and clearing would only occur on the north bank of the river for the preferred route (Noon Road). Crossing at Noon Road is preferred because relatively fewer mature cottonwood trees would be cleared or trimmed than for the Pollinder/Timon Road crossing. In addition, the trees that would be cleared

or trimmed on the west bank at the Pollinder/Timon Road crossing appear to be critical habitat for roosting bald eagles. Using the preferred route will minimize potential impacts.

Compensation for the clearing and trimming to occur in wetlands, riparian areas and wetland buffers will be in the form of wetland and riparian forest enhancement. Enhancement will be located in the riparian area of the Nooksack River in the vicinity of the two locations being considered for the S2GF/Bellingham transmission line crossing. Non-native vegetation such as Japanese knotweed and Himalayan blackberry will be removed from these areas by hand pulling and shoveling. Native vegetation such as Sitka willow, Scouler's willow, Pacific willow, and cottonwood will be planted in these areas as appropriate.

The above measures are expected to eliminate or minimize the impacts of the project. No additional mitigation measures for construction impacts are anticipated.

3.5.5.2 Operation

S2GF Site

An 11.87-acre mitigation area is proposed to compensate the loss of wildlife habitat associated with the two emergent wetlands after site construction. A description of this compensatory mitigation area can be found in Section 3.4 - Wetlands and Vegetation.

To prevent water quality impacts to fish, plant site stormwater runoff will be treated by a lined stormwater detention pond that would flow into a stormwater drainage channel, which would also receive runoff from the south. Runoff from the drainage channel would flow into the existing drainage ditch that flows through crossing B-S14 along the eastern border of the plant site.

No additional mitigation measures for operational activities are required.

Natural Gas Pipeline

No mitigation measures for operational activities are required.

Sewer and Water Pipelines

No mitigation measures for operational activities are required.

Electrical Transmission Lines

Compensation for the clearing and trimming of seedling cottonwoods at the Nooksack River crossing will be in the form of wetland and riparian forest enhancement.

Enhancement will be located in the riparian area of the Nooksack River in the vicinity of the two locations being considered for the transmission line crossing. Nonnative vegetation such as Japanese knotweed and Himalayan blackberry will be removed from these areas by hand pulling and shoveling. Native vegetation such as Sitka willow, Scouler's willow, Pacific willow, and cottonwood will be planted in these areas as appropriate. No additional mitigation measures for operational impacts are required.

Mitigation for potential avian collisions will include the use of visible markers, such as aircraft warning balls and the non-use of ground wires, to reduce avian mortality in the transmission line ROWs (Hoopes 1992). The electrocution of raptors, due to landing on a transmission line and touching both phases is precluded by the design of the project's transmission lines. The large spacing between the lines prevents contact with both phases by large birds landing on the lines (O'Neil 1988).

3.5.6 Cumulative Impacts

Although the transmission lines do not create a significant detrimental effect on the riparian zones of the streams they cross, they do preclude the establishment of large trees in these areas. In this way, the transmission lines do contribute to the loss of large trees and recruitment of large woody debris in these streams. Other land uses such as road crossings and clearing for agriculture have and will likely continue to prevent the restoration of portions of the riparian areas associated with these streams to a natural condition.

These impacts would contribute, in a small yet incremental way, to past and likely future losses of fish habitat that have occurred in the project area. Past adverse effects on fish and wildlife can be greatly attributed to large-scale conversion of wetlands, streams, and forested habitats to cropland and pastureland. In effect, these past impacts reduce the overall impact of the proposal, since the loss of high-quality native communities has already occurred.

The likely future losses to which impacts from the proposal would add are mostly related to residential and industrial development. Agricultural lands, which replaced native habitats, nevertheless can often provide better fish and wildlife habitat than residential and industrial development.

However, the project would not cause growth or additional development, since it is intended to meet and service existing energy needs, rather than to create surplus needs to promote growth beyond that which is currently expected. Energy supply is not a major factor limiting or promoting growth in this region. In addition, the proposal would not serve as a precedent for future actions that may impact fish and wildlife habitat.

In conclusion, the project would contribute only minimally to cumulative impacts on fish and wildlife.

3.5.7 Significant Unavoidable Adverse Impacts

The impacts to fish and wildlife habitat are distributed over a large geographic area and would likely occur as has been described in the above sections. Maintenance of installed structures, especially by trimming vegetation, would cause these impacts to continue over a long period of time, however the magnitude of these impacts is relatively small. Since most of the project area is within an agricultural area, there are fewer habitat types and many of the plant communities are highly modified and thus provide relatively little value to wildlife. No significant unavoidable adverse impacts would occur to fish and wildlife or their habitat from the construction or operation of this project and associated facilities.